

**REMARKS :**

Applicant thanks Examiner Abu Ali for her time and consideration of the present application during the telephonic interview of August 4, 2011 with the undersigned.

During the interview, DU BOURG's teaching of "dilution" was discussed, i.e., dilution of a test sample, not the actual starch solution. Moreover, it was explained that the claimed properties, i.e., viscosity for a particular dry matter content (DM), nitrogen level and pH, depend on the specific starch selected.

**Status of the Claims**

Claims 34, 35 and 42 remain in this application.

**Claim Rejections-35 USC §103**

Claims 34, 35 and 42 were rejected under 35 U.S.C. §103(a) as being unpatentable over DU BOURG et al. WO 01/96403 ("DU BOURG") in light of its U.S. equivalent: US 2004/0112559. This rejection is respectfully traversed for the reasons below.

The claims are directed to the following required method steps for preparing a sizing composition:

- providing a cationic liquid starchy composition,
- diluting the composition (DM= between 0.5 to 9%),
- mixing the diluted solution with a sizing agent comprising alkenylsuccinic anhydride.

The cationic liquid starchy composition provided is

- DM: between 10 and 50%,
- Viscosity: 275 mPa~s to 930 mPa~s.
- Total nitrogen level: 0.6% to 1.4% by dry weight,  
and
- pH: between 3.5 and less than 9.

The maintained position has been that DU BOURG teaches a starch comprising a DM of 5-65%, a fixed nitrogen level at a range less than 2%, and a pH of up to about 10, and, thus, one skilled in the art would have found the optimal dilution rates through routine experimentation and optimization to obtain the claimed viscosity. The Official Action further notes that the composition may be mixed with alkenylsuccinic anhydride.

However, DU BOURG does not disclose a cationic starchy composition as claimed.

Indeed, the paragraph of DUBOURG to which the Official Action refers as suggesting dilution step to achieve a desired viscosity [0058] does not even refer to a sizing composition. Instead, [0058] describes dilution to achieve a desired dry matter (DM) content of 20% to determine viscosity by an "A test" in which each test sample has a DM of 20%. A similar dilution is suggested in the present specification [0049] of the published application for the claimed "T test", but to lower DM content of 10%.

Although the tests are not identical, the present Applicant Company (which is the assignee to both the claimed invention and DU BOURG) provides a correlation between the values obtained in DU BOURG and the claimed invention (see, e.g., page 6, line 31 to page 7, line 14):

The use in a very general way, and in particular in the preparation of sizing agent compositions, of cationic solid or liquid starchy compositions exhibiting a limited nitrogen level (at most equal to 2%) and a very low viscosity, namely of less than 1600 mPa.s, for a DM adjusted to 20%, has been recommended by the Applicant Company in its abovementioned patent WO 01/96403. This viscosity, thus measured at a DM of 20%, lies very preferably between 50 and 700 mPa.s.

As has been confirmed by the Applicant Company, in particular for the starchy compositions used in the examples of said patent, this viscosity, if it had been measured for a DM adjusted to 10% (instead of 20%), would have been (much) less than 200 mPa.s.

This is in particular the case with "composition 2", envisaged in the preparation of an ASA emulsion according to example 6 of said patent, which already, at a DM adjusted to 20%, exhibits a viscosity (100 mPa.s) of much less than 200 mPa.s.

That is, the viscosity of 5-1500 mPa.s, based on the A test at 20% DM, in DU BOURG would necessarily be less than 200 mPa.s according to the claimed T test (at 10% DM).

Furthermore, as provided in the Declaration under 37 CFR 1.132 by Nicolas LEROY (who has a PhD. in paper chemistry), in the Appendix, a viscosity value of 275 mPa.s measured at 10 % DM corresponds to or is equivalent to a viscosity of 2400 mPa.s measured at 20 % DM.

Accordingly, the viscosities disclosed by DU BOURG cannot fall within the scope of the claimed viscosity of at least

equal to 275 mPa.s and at most equal to 930 mPa.s (measured by the T test). Thus, based on viscosity measurements alone, DU BOURG does not disclose a cationic starchy composition as claimed.

However, the claimed invention is not simply a cationic starchy solution of a given viscosity by the T test method. The claimed invention concerns the combination of various properties, which includes a particular viscosity for a solution having a DM between 10 and 50%, as well as a nitrogen level of 0.6-1.4%, and a pH of between 3.5 and 9. These properties all depend on the starch selected, e.g., as explained in the published present application [0034]-[0042] and [0067]. DU BOURG does not suggest a cationic starchy composition with all of these properties.

As a result of this combination of properties of the claimed cationic starchy composition, one is able to obtain (after diluting and mixing with a sizing agent) an optimum particle size for the sizing agent emulsion having a superior stability of the sizing agent.

These superior results are demonstrated in Example 3 of the present application, which compares preparing sizing compositions utilizing from the claimed cationic liquid composition, i.e. Composition B and Composition A, to preparing sizing compositions based on the DU BOURG (Composition 2 of Example 4 and Example 6) Composition T1. The claimed invention leads to better "protection", or better stabilization,

of an alkenylsuccinic acid (or ASA) based sizing agent, e.g., protection in the composition formed by the claimed method.

This higher "protective power" can be deduced from the lower particle size (8.2 and 7.5 mm respectively for Additives A and B instead of 11.4 mm for Additive T1) of the sizing composition after 24 hours of storage.

These results are both unexpected and superior to DU BOURG, as DU BOURG does not disclose a single example that falls within the instant claims. For example, in Example 6 of DU BOURG, which deals with ASA-based sizing agents, the cationic starch composition used has a very low viscosity (100 mPa·s when measured at 20 % dry matter). Thus, there is no suggestion in DU BOURG that a more viscous concentrated cationic starch compositions, diluted and mixed with ASA would obtain a more stable ASA based sizing composition.

Additional experimental results have been prepared to further demonstrate these unexpected superior results in the Declaration under 37 CFR 1.132 in the Appendix. Mean particle sizes were measured for several composition at T0 and T24, i.e., in a manner consistent with the specification. The experiments compare, in addition to the inventive compositions A and B from the present specification:

- (1) A composition with 3 % of DM, a total nitrogen level of 1.2%wt and a low viscosity (less than 275 mPa·s as claimed, but within the range of DU BOURG),

- (2) A composition with 7 % of DM and a low viscosity (less than 275 mPas as claimed, but within the range of DU BOURG),
- (3) A composition with 3 % DM and both a high nitrogen level (total nitrogen level of 1.5%, outside of the claimed range) and a low viscosity, i.e., composition T1 (Composition 2 of DU BOURG as carried out in the specification),
- (4) A composition (comparative) with 7 % of DM and both a high nitrogen level (total nitrogen level of 1.5%, outside of the claimed range) and a low viscosity, i.e., composition T1 (Composition 2 of DU BOURG as carried out in the specification),
- (5) A composition (according to the claimed invention) with 3% DM, a total nitrogen level of 1.2%wt. and a viscosity of 325 mPas according to the claimed method, and
- (6) A composition (according to the claimed invention) with 7% DM, a total nitrogen level of 1.2%wt. and a viscosity of 325 mPas according to the claimed method.

As further evidenced by this data, cationic starchy compositions suggested by DU BOURG (compositions (1), (2), (3) and (4)), and contrary to the claimed invention (compositions A, B, (5) and (6)), are not able to achieve the same stability or protective power for a sizing agent (i.e., Comparing T0 to T24). This data is clearly unexpected in view of DU BOURG, as there is no suggestion of this superior stability.

Therefore, claims 34, 35 and 42 are not rendered obvious by DU BOURG, and withdrawal of the rejection is respectfully requested.

**Conclusion**

In view of the foregoing remarks and attached declaration, this application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our credit card which is being paid online simultaneously herewith for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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**APPENDIX:**

The Appendix includes the following item:

☒ - a 37 CFR 1.132 Declaration